



Kwartaal 1, Toets 2 (Eksponente, getalpatrone en vergelykings) 2024 – Memorandum

**Vraag 1**

Vereenvoudig, sonder die gebruik van 'n sakrekenaar.

Laat jou antwoord met positiewe eksponente.

1.1 
$$\frac{(-\sqrt{1})^4(-2x^{-0.5}y^2z^2)^3}{(3^{-4})^{-\frac{1}{4}}(xy^3z^{\frac{1}{3}})^3} \quad (3)$$

$= \frac{-8x^{-\frac{3}{2}}y^6z^6\checkmark}{3^1x^3y^9z^1\checkmark}$
$= \frac{-8z^5\checkmark}{3^1x^2y^3}$

1.2 
$$\frac{5^{n-1}}{125^{\frac{n}{3}-1}} \quad (2)$$

$= \frac{5^{n-1}}{5^{n-3}\checkmark}$
$= 5^{n-1-(n-3)}$
$= 5^2 \checkmark \text{ OF } 25$

1.3 
$$\frac{64^{x-1} \cdot (\frac{1}{4})^{2x-1}}{16^{-x-1}} \quad (5)$$

$= \frac{(2^6)^{x-1} \cdot (2^{-2})^{2x-1}}{(2^4)^{-x-1}}$
$= \frac{2^{6x-6}\checkmark \cdot 2^{-4x+2}\checkmark}{2^{-4x-4}\checkmark}$
$= 2^{6x-6-4x+2-(-4x-4)} \checkmark$
$= 2^{6x} \checkmark$

1.4 
$$\frac{b^{2y}-b^y-12}{(b^y)^2+3b^y} \quad (3)$$

$= \frac{(b^y-4)(b^y+3)\checkmark}{b^y(b^y+3)\checkmark}$
$= \frac{b^y-4}{b^y} \checkmark$

$$1.5 \quad \frac{3^{3x-1} - \frac{1}{9} \cdot 27^x}{3^{3x} \sqrt{\frac{4}{81}}} \quad (4)$$

$$= \frac{3^{3x-1} - 3^{-2} \cdot 3^{3x}}{3^{3x} \cdot \left(\frac{2}{9}\right) \sqrt{\quad}}$$

$$= \frac{3^{3x}(3^{-1} - 3^{-2}) \sqrt{\quad}}{3^{3x} \cdot \frac{2}{9}}$$

$$= \frac{3^{3x} \left(\frac{2}{9}\right) \sqrt{\quad}}{3^{3x} \cdot \frac{2}{9}}$$

$$= 1 \sqrt{\quad}$$

$$1.6 \quad \frac{9^x - 4}{2 - 3^x} \quad (3)$$

$$= \frac{(3^x - 2)(3^x + 2) \sqrt{\quad}}{-(3^x - 2) \sqrt{\quad}}$$

$$= -(3^x + 2) \sqrt{\quad} \text{ OF } -3^x - 2$$

$$1.7 \quad \frac{2^{2024} - 2^{2022} + 3}{2^{2022} + 1} \quad (3)$$

$$= \frac{2^{2022}(2^2 - 1) \sqrt{\quad} + 3}{2^{2022} + 1}$$

$$= \frac{2^{2022}(3) + 3}{2^{2022} + 1}$$

$$= \frac{3(2^{2022} + 1) \sqrt{\quad}}{2^{2022} + 1}$$

$$= 3 \sqrt{\quad}$$

$$1.8 \quad \text{Wat is 'n derde van } 3^{-3} \text{? (Los jou antwoord in eksponentvorm.)} \quad (2)$$

$$= 3^{-1} \sqrt{\quad} \cdot 3^{-3}$$

$$= 3^{-4}$$

$$= \frac{1}{3^4} \sqrt{\quad}$$

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## Vraag 2

2.1 Beskou die volgende getalpatroon:

$$-3; 4; 11; 15; \dots$$

2.1.1 Bepaal die  $n^{\text{de}}$  term van hierdie patroon. (2)

$$T_n = 7n\sqrt{-10\sqrt{\quad}}$$

2.1.2 Vervolgens, bepaal die  $150^{\text{ste}}$  term. (2)

$$T_{150} = 7(150) - 10\sqrt{\quad}$$

$$T_{150} = 1040\sqrt{\quad}$$

2.1.3 Watter term sal die eerste een wees met 'n waarde groter as 250? (3)

$$7n - 10 > 250\sqrt{\quad}$$

$$7n > 260$$

$$n > 37,14\sqrt{\quad}$$

$$\therefore n = 38\sqrt{\quad}$$

2.2 Bepaal die waarde van  $y$  in die volgende lineêre getalpatroon: (3)

$$y - 3; y + 2; 2y - 3; \dots$$

$$y + 2 - (y - 3)\sqrt{\quad} = 2y - 3 - (y + 2)\sqrt{\quad}$$

$$5 = y - 5$$

$$y = 10\sqrt{\quad}$$

2.3.1 Bepaal die algemene term van die volgende nie-lineêre getalpatroon: (2)

$$\frac{y^2-3}{4}; \frac{y^3-3}{8}; \frac{y^4-3}{12}; \dots$$

$$T_n = \frac{y^{n+1}-3\sqrt{\quad}}{4n\sqrt{\quad}}$$

2.3.2 Vervolgens, bepaal die waarde van die  $10^{\text{de}}$  term. (2)

$$T_{10} = \frac{y^{10+1}-3\sqrt{\quad}}{4(10)\sqrt{\quad}}$$

$$T_{10} = \frac{y^{11}-3\sqrt{\quad}}{40\sqrt{\quad}}$$

### Vraag 3

3.1 Los op vir  $x$ , in elk van die volgende vergelykings:

3.1.1  $3(x - 1) = -x - 3$  (2)

$$3x - 3\checkmark = -x - 3$$

$$4x = 0$$

$$x = 0\checkmark$$

3.1.2  $-(x + 2)(x - 3) = 0$  (2)

$$x = -2\checkmark \text{ OF } x = 3\checkmark$$

3.1.3  $4x^2 = -8x$  (4)

$$4x^2 + 8x = 0\checkmark$$

$$4x(x + 2) = 0\checkmark$$

$$x = 0\checkmark \text{ OF } x = -2\checkmark$$

3.1.4  $6x^2 - 13x - 5 = 0$  (3)

$$(2x - 5)(3x + 1) = 0\checkmark$$

$$x = \frac{5}{2}\checkmark$$

$$x = -\frac{1}{3}\checkmark$$

3.1.5  $(2x - 1)^2 = 144$  (3)

$$2x - 1 = 12 \text{ OF } 2x - 1 = -12\checkmark$$

$$x = \frac{13}{2}\checkmark \quad x = -\frac{11}{2}\checkmark$$

3.1.6  $\frac{2x-5}{x^2-2x-8} = -\frac{2}{2x+4}$  (5)

$$\frac{2x-5}{(x-4)(x+2)\checkmark} = -\frac{2}{2(x+2)\checkmark}$$

$$\times 2(x-4)(x+2)\checkmark: 4x - 10 = -2x + 8\checkmark$$

$$6x = 18$$

$$x = 3\checkmark$$

3.1.7  $x - 7x^{\frac{1}{2}} + 10 = 0$  (3)

$$\left(x^{\frac{1}{2}} - 2\right)\left(x^{\frac{1}{2}} - 5\right) = 0\checkmark$$

$$x^{\frac{1}{2}} = 2 \quad \text{OF} \quad x^{\frac{1}{2}} = 5$$

$$x = 4\checkmark \quad x = 25\checkmark$$

$$3.1.8 \quad 5 \cdot 5^{2x-1} = \frac{1}{5} \quad (2)$$

$$5^{2x} = 5^{-1} \checkmark$$

$$x = -\frac{1}{2} \checkmark$$

$$3.1.9 \quad 3 \cdot 3^{-2x} - \frac{1}{9^x} = 54 \quad (4)$$

$$3 \cdot 3^{-2x} - 3^{-2x} \checkmark = 54$$

$$3^{-2x}(3 - 1) \checkmark = 54$$

$$3^{-2x} = 27$$

$$3^{-2x} = 3^3 \checkmark$$

$$-2x = 3$$

$$x = -\frac{3}{2} \checkmark$$

$$3.1.10 \quad 9 \leq 2x - 1 \leq 15 \quad (3)$$

$$10 \leq 2x \leq 16 \checkmark$$

$$5 \leq x \leq 8$$

$\checkmark$ grense  $\checkmark$ notasie

3.2 Los vir  $x$  en  $y$  gelyktydig op:

$$x - 6y = 8 \text{ en } 2x - 2y = 6 \quad (5)$$

$$x - 6y = 8 \dots\dots (1)$$

$$x - y = 3 \dots\dots (2) \checkmark$$

$$(1) - (2): -5y = 5 \checkmark$$

$$y = -1 \checkmark$$

Stel  $y = -1$  in (1)

$$x - 6(-1) = 8 \checkmark$$

$$x = 2 \checkmark$$

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Totaal: [75]